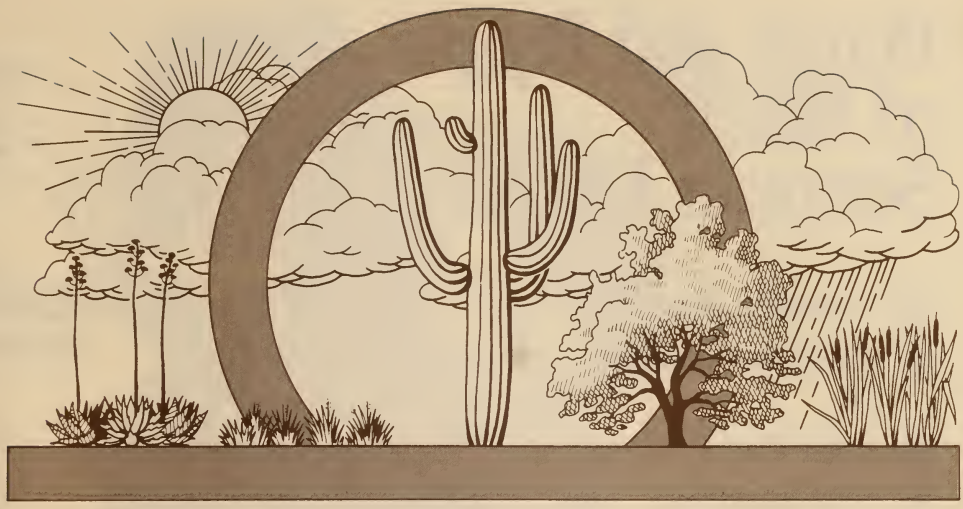
# Plants and People of the Sonoran Desert

*Trail Guide*

*Fifty Cents*



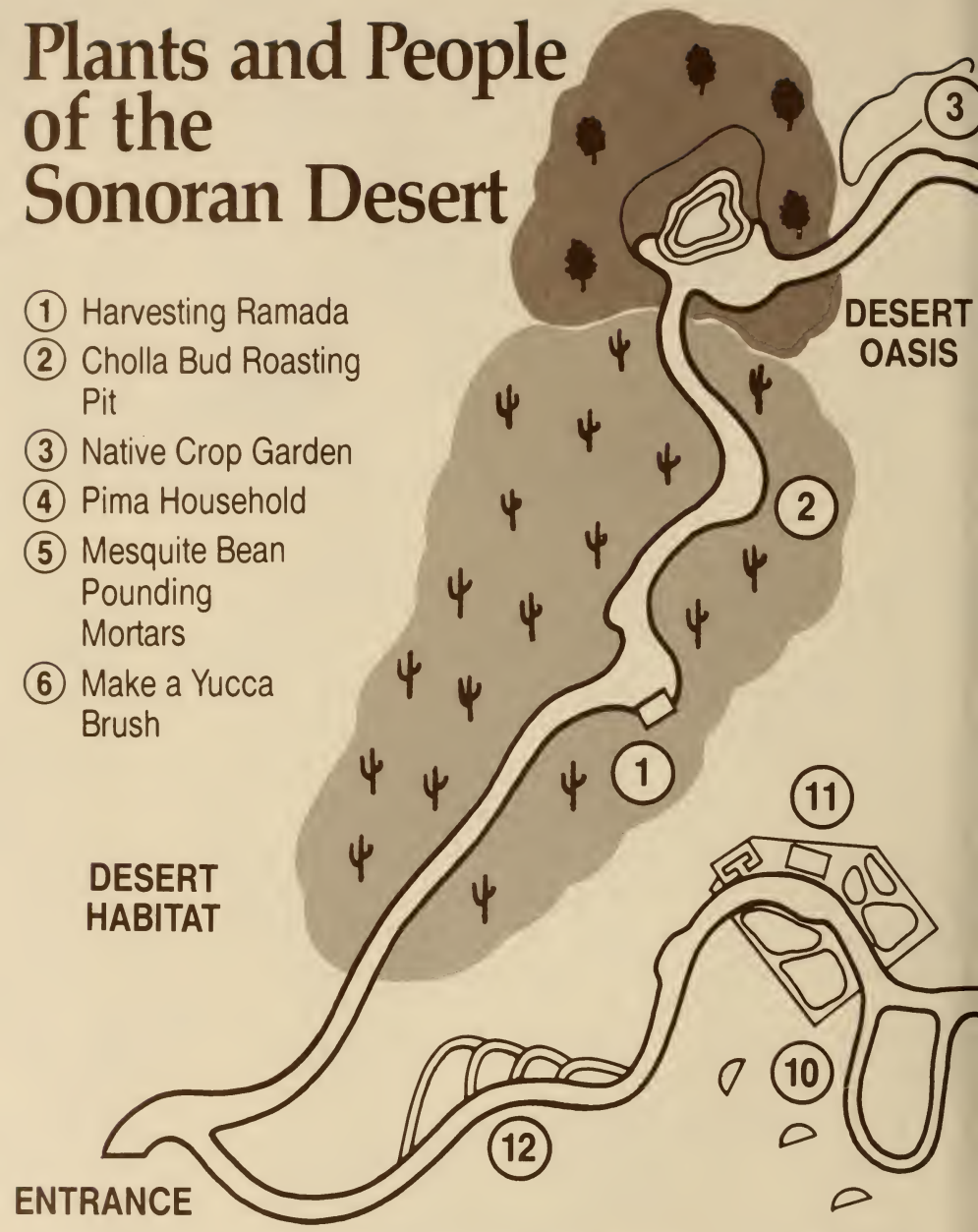
# *The Desert Is Our Home*

Deserts are often imagined to be barren wastelands, inhospitable and barely survivable. But for thousands of years human beings have lived in and around the Sonoran Desert. This desert has been more than simply a place in which to survive. Instead, it has been a rich and bountiful homeland with more than 400 edible plants and hundreds more that have medicinal, construction and other uses.

During the centuries that people lived here, they developed an intimate knowledge of the desert and its plants. They knew which plants to use, when and where to gather them, and how to store and prepare them. This specialized knowledge of desert plants has been handed down from generation to generation for hundreds of years. Though the desert way of life has changed dramatically, desert plants are still being used in some traditional ways and also in some new ways.

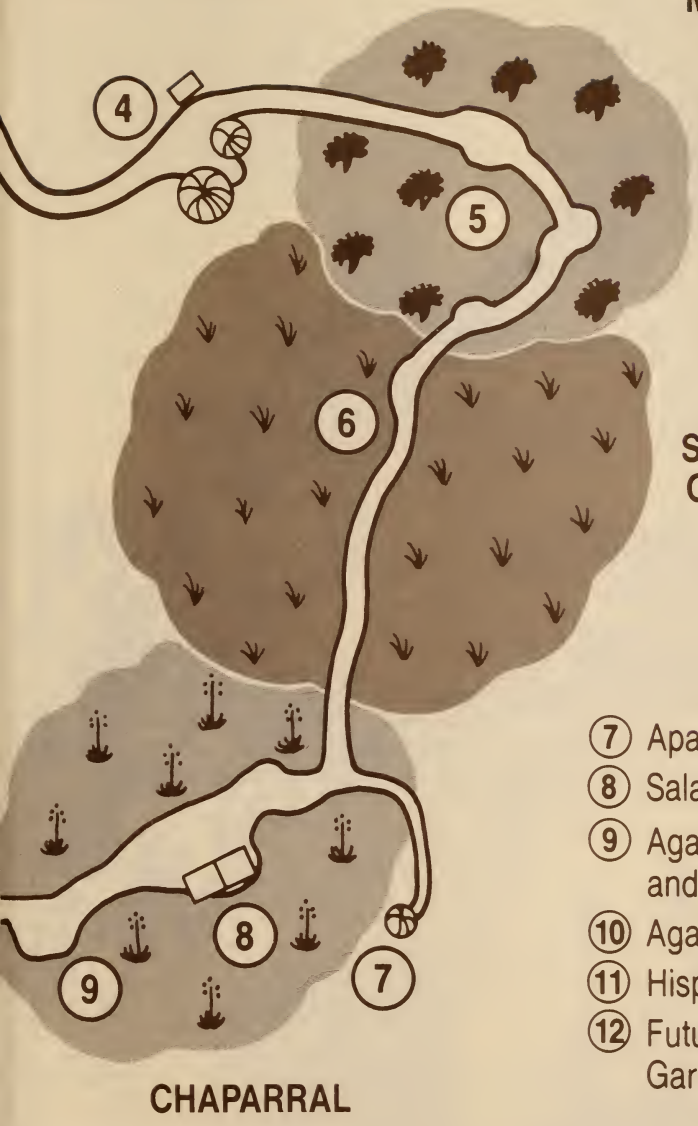
This exhibit, *Plants and People of the Sonoran Desert,* is about some of the ways people have used plants from the Sonoran Desert region. It is hoped that this exhibit will increase our understanding and appreciation of the richness of this desert land.

# Plants and People of the Sonoran Desert




## *How to Use This Trail Guide*

As you walk through the exhibit you will see plants identified by small signs that describe their uses. This Trail Guide provides additional information about many of these plants. The plants are grouped by habitat and are listed in alphabetical order by their common name.

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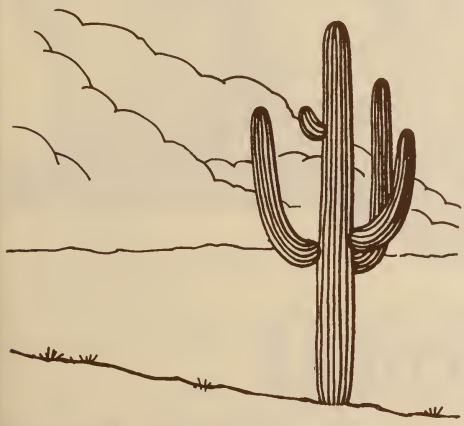
Rio Asuncion
Sonoran Desert
Semidesert Grassland
Chaparral

# The Sonoran Desert Region

The Sonoran Desert region varies in land forms, soil types and moisture. As a result, several habitats — communities of plants and animals — have developed in this area. The five habitats in this exhibit are the major ones in or near the northern Sonoran Desert.



## Desert Habitat

The tall cacti, small trees and hardy shrubs that grow in this major habitat of the Sonoran Desert are found at elevations below 3,500 feet. Less than 10 inches of rain falls here each year.

## Desert Oases

Streams and springs are found in a few desert areas. They provide water for many plants that wouldn't otherwise be found in the desert.

## Mesquite Bosques

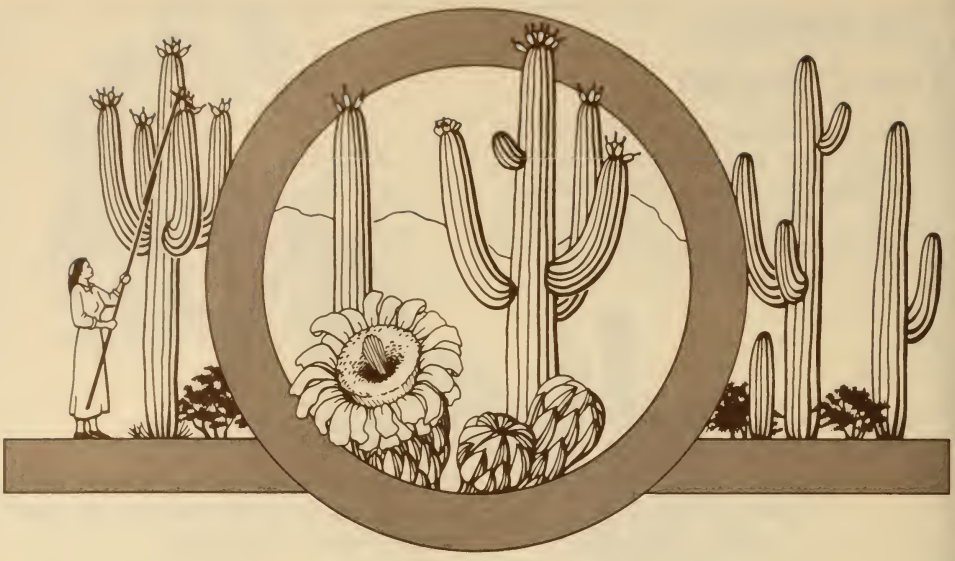
Small mesquite forests are found in the desert along meandering water channels and where the groundwater level is high.

## Semidesert Grasslands

These grasslands mainly border the eastern edges of the Sonoran Desert at elevations of 3,500 to 4,500 feet. Their annual rainfall is 10 to 18 inches.

## Chaparral

Chaparral habitats border the Sonoran Desert mainly to the north. They are found at elevations of 3,500 to 6,000 feet, and their tough shrubs get between 13 and 23 inches of rain each year.



# Desert Habitat

The desert has a unique kind of beauty. Towering saguaro cacti and green-trunked palo-verde trees thrive in the foothills. Creosote bushes fill the valleys. Small trees, like mesquite and ironwood, grow in washes where runoff supplements the 10 inches of rain they receive each year.

Rain in the desert falls during two seasons. In winter there are gentle, widespread rains; in summer, heavy storms often occur in localized areas. This seasonal pattern allows more plants to thrive here than in other deserts.

In earlier times, people valued this habitat because they relied on it for shelter, medicine and food. Cactus fruit is particularly abundant. Cacti thrive on the well-drained soil of the desert's warm slopes and produce fruit dependably each year. Today, many people appreciate the tranquility and beauty of the desert landscape, and they turn to it as a place to explore and enjoy.

# Brittle-bush

*Encelia farinosa*

Children like to chew the sticky, golden sap which oozes from cracks along brittle-bush stems. This sap can be melted and used for a varnish or glue, or burned as incense.

# Chia

*Salvia columbariae*

People gather the seeds of this plant to make a thirst-quenching beverage. When mixed with water, the mucilaginous seeds swell and form a gel-like drink.

# Cholla

## (Buckhorn, Cane, Pencil, Staghorn)

*Opuntia acanthocarpa, O. spinosior, O. arbuscula, O. versicolor*

People have relied on cholla flower buds as an important wild food staple. They are comparable to other flower bud vegetables such as broccoli. After cooking, the buds can be dried in the sun and saved for use later. They are an excellent source of calcium.

# Creosote

*Larrea tridentata*

The resinous leaves of the creosote bush scent the air after a rain. These resins contain camphor and have antiseptic and antibiotic properties. Many desert peoples have used creosote tea to treat a wide range of illnesses.

Scale insects secrete lac on creosote stems. People removed the lac and heated it to use as a waterproof sealer and adhesive.

# Fishhook Barrel

*Ferocactus wislizenii*

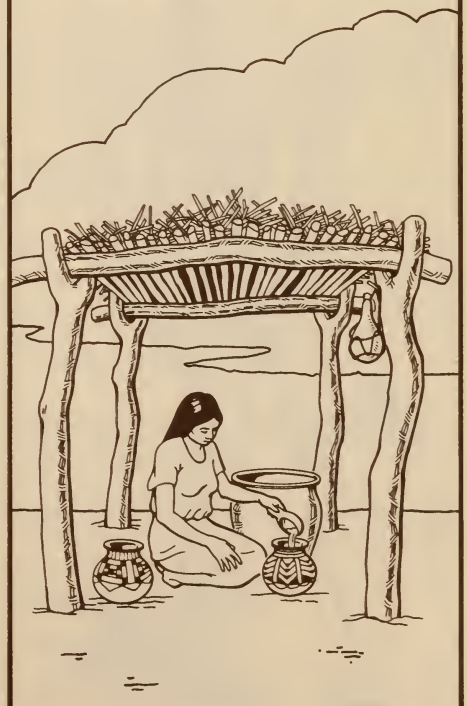
People have eaten the buds, flowers, fruit and seeds of this cactus. They have also cooked and eaten chunks of the pale green, pulpy stem and squeezed the liquid out of the stem as an emergency source of liquid. The stems of other species of barrel cactus can be toxic.

# *Comfort*

Desert people found many ways to make their lives in the desert more comfortable. They built shade structures or ramadas to provide protection from the ever-present desert sun. They also avoided the sometimes harsh conditions of the desert by working at dusk or dawn and taking shelter at midday — an option few of us have today.

Drinking water was cooled by keeping it in pottery jars made from a special clay mix. The jar allowed minute amounts of water to seep through the sides; this evaporated and cooled the water. Another form of evaporative cooling was to sprinkle water on the swept dirt floors and brush walls of the house. Then, a breeze blowing through would cool the air.

Life in the desert wasn't always easy. But resourceful people have managed to do more than merely survive here. The desert afforded them rich and full lives. The desert was their home.



# Little-leaf Palo-verde

*Cercidium microphyllum*

In the spring, people gather the green, immature pods and developing seeds which taste somewhat like peas. By summer the pods have dried and the seeds have become very hard. With some effort they can be ground and sifted. Ground palo-verde seeds taste a little like peanuts.

# Joint-fir

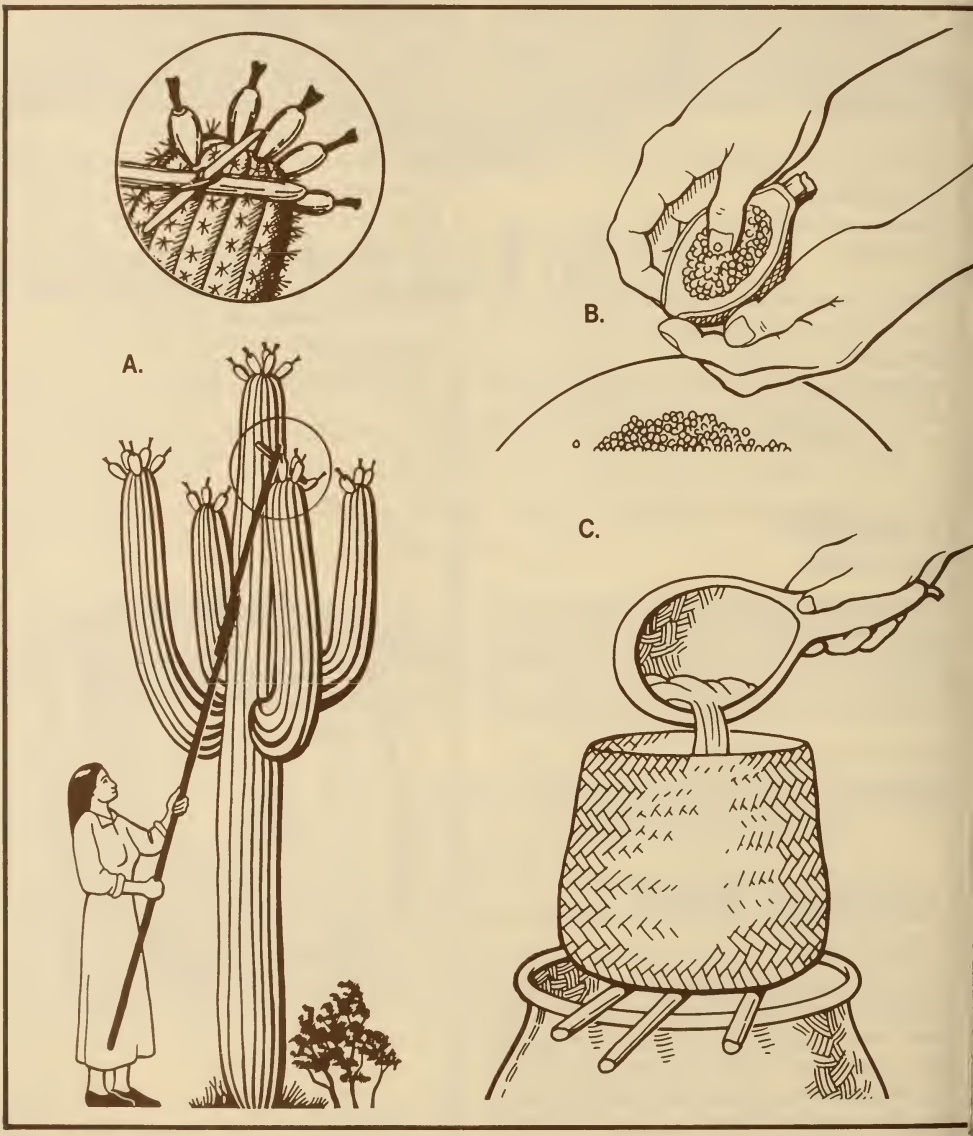
*Ephedra* spp.

A pleasant-tasting tea can be made from joint-fir stems. In earlier times this popular beverage was also used as a medicine.

# Ironwood

*Olneya tesota*

Ironwood seeds, which mature in midsummer, have been eaten raw or cooked, whole or



ground. The dense, hard wood has been used to make houses, tools and other items, in addition to being an excellent fuel.

## Jojoba

*Simmondsia chinensis*

People eat the large seeds as a snack, but these seeds contain a liquid wax which is largely indigestible. The pulverized seeds have been used as a medicine and hair conditioner. Jojoba "oil" is currently used in cosmetics and is under study as an industrial lubricant.

## *Preparing Saguaro Fruit*

The ripe fruit of the saguaro cactus can be collected in late June and July. To collect the fruits, which grow on the tips of this tall cactus, you need to make a harvesting pole. Use the woody skeleton of a dead saguaro. Wire two long ribs together and attach a foot-long cross-piece at a 45 degree angle to the end. Use the cross-piece to push or pull the fruit off the cactus as in Figure A. Gather only the fruits that are ripe; they usually have a red blush and a swollen shape. You may wish to harvest with a friend so that one person can knock the fruit off and the other can watch where it falls and pick it up.

Seedy saguaro fruit is delicious fresh. If you wish to separate the seeds, remove the pulp from the rind as in Figure B. Add a small amount of water, simmer and then strain out the seeds. In the past, strainers were plaited out of the leaves of sotol (see p. 27) as in Figure C, but any fine sieve will do. The juice can be used in many recipes. Simmering it into a delicious syrup is a traditional O'odham recipe. The seeds can be used whole or ground, and added to cereals, breadstuffs and other foods.

## Mistletoe

*Phoradendron californicum*

The berries of this desert species of mistletoe are not poisonous like those of other species. The berries were usually boiled and mashed before being eaten.

## Ocotillo

*Fouquieria splendens*

The straight, woody stems have been used to make buildings and fences. When placed in the ground the stems often take root and continue to grow. People have eaten the bright red buds and nectar-filled flowers.

## Pincushion

*Mammillaria microcarpa*

The small, spineless red fruits of this cactus can be eaten as a snack.

## Queen of the Night

*Peniocereus greggii*

The tubers of this plant can weigh up to 75 pounds. People roasted them and then peeled and ate them. They quenched their thirst by sucking on slices of the raw tuber.

## Saguaro

*Carnegiea gigantea*

The fruit of the saguaro has been an important food to many desert dwellers and the saguaro's woody skeletal ribs are useful construction material. This plant figures prominently in the ceremony and lore of the desert.

## Strawberry Hedgehog

*Echinocereus engelmannii*

People singe the spines off the fruits of this cactus and eat the sweet, seedy white pulp.

## White Ratany

*Krameria* spp.

People have boiled the thick, red roots of this plant to make a pink dye. They chewed pieces of the fresh root to treat sore throats.

# Desert Oasis

Water is scarce in the desert, but it can be found in streams and occasional seeps and springs. Cottonwood, willow and other tall trees grow beside these sources of water, and plants like cattail grow in the water.

Desert oases support many plants that would not otherwise be found in the desert. They also support a wide variety of wildlife. For example, some of the highest densities of breeding birds on the continent are found in oases habitats.

Early desert people found innovative ways to use the available surface water supply. More recently, as the demand for water increased beyond the supply, desert dwellers began pumping groundwater and building large dams to gain access to water that was previously unavailable. In the process, many desert oases have disappeared along with the rich variety of plants and wildlife found in them.

# Arrow-weed

*Tessaria sericea*

The straight, leafy branches have been used for thatching and to make large storage baskets, shelves and arrow shafts.

# Canaigre

*Rumex hymenosepalus*

Dyes ranging in color from yellow to red-brown can be made from the tuberous root of this plant. The root, which is high in tannin, has also been used to tan leather. People have chewed the root to relieve sore throats and colds, and have used it as a topical medicine for infections.

# Cattail

*Typha domingensis*

People have used many parts of the cattail plant. They have eaten the sweet, yellow pollen and the tender stalks and roots. The leaves are used in mats and the split, dried flowerstalks in baskets.

# Fremont Cottonwood

*Populus fremontii*

Cottonwood timbers have been used for construction and its pliable branches for baskets.

# Goodding Willow

*Salix gooddingii*

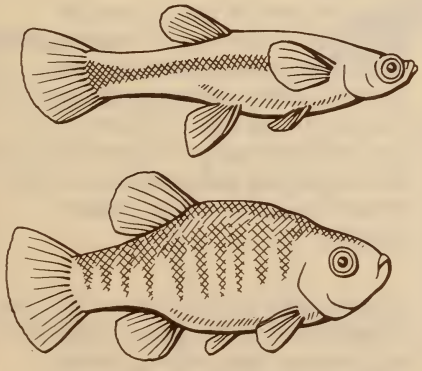
People have used young willow saplings to form the framework of buildings because they can be bent into shape easily. The pliable branches are favored for making baskets. The leaves and bark have been made into a tea which is used to reduce fever.

# Mesquite
## (Screwbean, Velvet)

*Prosopis pubescens, P. velutina*

Mesquite trees are one of the most useful trees of the Southwest. The seed pods can be pounded into a sweet flour. The tree provides medicine, dye, fiber, fuel and timber as well. (see pp. 20-23)

Gila Topminnow



Desert Pupfish

# *Desert Pupfish and Gila Topminnows*

*Cyprinodon macularius* and *Poeciliopsis occidentalis*

The Desert Botanical Garden is pleased to serve as a preserve for two endangered species of fish, Desert Pupfish and Gila Topminnows.

These fish are compatible, occurring naturally in the backwaters of desert streams and in springs. The major reasons for their endangered status are the loss and modification of their habitat and the introduction of predatory non-native fish.

Each species reaches a length of about 2 inches. During breeding season in the spring, male topminnows turn black with a yellow stripe down the midline. Male pupfish turn a brilliant blue at this time.

# Reed

*Phragmites australis*

The stems of reeds can be split and woven into mats and baskets. Reeds have also been used as thatching and to make flutes and pipes.

# Sacred Datura

*Datura meteloides*

Although people have used this plant for ceremonial and medicinal purposes, they have always been aware that it is dangerous. All parts of the datura plant are poisonous and potentially deadly, but the roots are especially potent.

# Saltbushes

## (All-scale bush, Fourwing saltbush, Quailbush)

*Atriplex polycarpa, A. canescens, A. lentiformis*

People used to eat the small seeds of saltbushes as an emergency source of food. They also cleaned clothing and baskets by rubbing them with the wetted leafy branches.

# Sunflower

*Helianthus annuus*

The seeds of this plant can be collected and eaten raw, roasted or ground into a meal. The inner stalk has been chewed fresh as a gum, and dried to be used as fast-burning candles.

# Yerba-mansa

*Anemopsis californica*

The astringent, aromatic roots of this plant have a history of being an important medicine. Sometimes the whole plant is used but more frequently the root is used. People chew the roots or use root tea to treat respiratory ailments. Root tea is also used as a wash for wounds.

# *The Art of Basketry*

Desert people have been making baskets for over 9,000 years. Three common techniques used are plaiting, coiling and twining.

**Plaiting**

When plaiting, the weaver passes single, flat strips over and under each other at a fixed angle as in Figure A. The plant parts that are commonly used for plaiting include split reed stems and the leaves of cattails, yuccas and agave.

**Coiling**

Coiling means the weaver uses a sewing technique in which she wraps the sewing material around the coiled foundation and sews it to the completed coil beneath as in Figure B. The coiled foundation is made from a variety of plant parts including pliable branches, split cattail stalks, split beargrass leaves and grass stems.

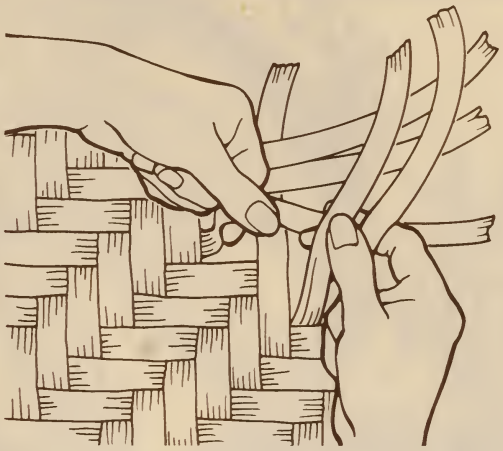
Basketweavers use yucca leaves, thin strips of pliable branches or devil's claw to sew the coils together. Strips of willow, cottonwood or skunkbush sumac branches are commonly used.

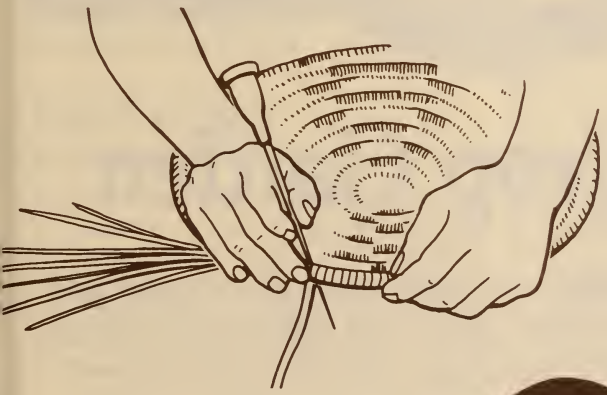
**Twining**

There are several types of twined baskets, including wicker baskets. When twining, the weaver holds the warp stationary while she carries the weft over and under it as in Figure C. The warp often consists of straight branches, like willow. The weft consists of whole or split branches or other pliable material.

Basketweavers usually gather their plant material in a certain season. They store their material after peeling, dyeing, splitting or thinning it. Then when needed, they soak the material in water or bury it in damp sand to make it pliable for basketmaking.

**A. Plaiting:**
Single strips are passed over and under each other at a fixed angle.





**B. Coiling:**
An awl is used to make a hole in the coil for the sewing material to pass through.

**C. Twining:**
The weft is carried over and under the warp.

# Native Crop Garden

Desert people began farming over 2,000 years ago to supplement the wild plants they used. They grew many types of corn, beans, gourds, squash and cotton. The origins of these crops can be traced to ancient Mexico. These plants became well adapted to the drought, heat, salty soil and pests of the desert, because farmers selected seeds from the healthiest plants to use for the next planting.

Farmers also grew desert plants in their gardens, including devil's claw, which was used in making baskets. Even weeds in gardens were gathered for food, especially their nutritious leaves and seeds.

Desert farmers planted gardens where they could get water. They planted in floodplains, channeled storm runoff, terraced hillsides to collect rainfall, and built irrigation canals. The largest prehistoric irrigation system in America was built by the Hohokam Indians in the area that is now Phoenix.

# Aboriginal Pima Cotton

*Gossypium hirsutum* v. *punctatum*

This is the closest descendant of the short staple cotton cultivated by the Pima and the prehistoric Hohokam Indians. Cotton is heat tolerant but requires irrigation and a long growing season.

# Careless-weed

*Amaranthus palmeri*

People gather the young leaves of this wild plant to cook like spinach. It comes up in wet, disturbed soil during the summer. People also gather its seeds to eat.

# Devil's Claw

*Proboscidea parviflora* v. *hohokamiana*

Wild devil's claw grows all over the Southwest, but American Indian farmers domesticated this variety for its longer fruits. It has white seeds in contrast to the black seeds of the wild devil's claw. Basketweavers use the black covering of the mature, dried fruit to produce designs in baskets.

# Grain Amaranth

*Amaranthus cruentus*

Archaeologists believe that the prehistoric Hohokam Indians grew amaranth as a crop as did the Aztecs from ancient Mexico. Amaranth seeds make a delicious flour used in breads and porridges. Cultivated amaranth has larger seed heads and thicker stalks than wild amaranth. The pale seeds can be popped like popcorn and are rich in lysine, an essential amino acid.

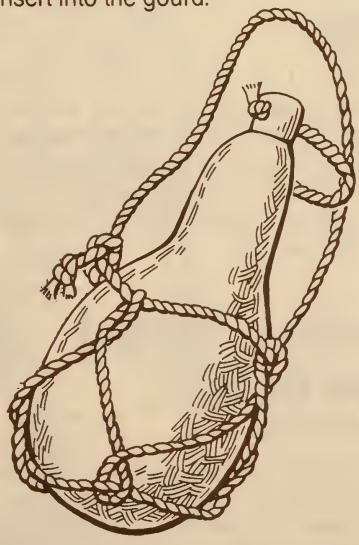
# Purslane (Common and False)

*Portulaca oleracea* and *Trianthema portulacastrum*

People gather these two wild lookalikes in the summer. They are eaten fresh in salads or added to soups and stews. They have a crunchy texture and pleasantly tart flavor.

## *Make a Gourd Canteen*

Allow the gourd to dry on the vine. When dry, cut the long end off and scrape out the seeds and fibrous pulp inside. Carve a "cork" out of a piece of cottonwood root or other wood and insert into the gourd.



# Hog-potato

*Hoffmanseggia densiflora*

This plant is found where floods occur along ditches or washes. Its tough, round tubers are about 1 inch wide and can be boiled and eaten like potatoes.

# Lambs-quarter

*Chenopodium* spp.

People gather the young leaves of wild lambs-quarter to cook like spinach. It comes up in wet, disturbed soil during the late winter and spring. Its seeds are also edible.

# O'odham Bottle Gourd

*Lagenaria siceraria*

The durable rind of the cultivated gourd makes it suitable for canteens, containers, dippers and rattles. Each gourd variety has a different shape. Gourds require extra water and a long growing season.

# O'odham Flour Corn

*Zea mays*

This fast-growing corn matures in about 60 days. People harvest the corn after the kernels are dry and roast it, or grind it into cornmeal. In earlier times, desert farmers grew red and blue varieties of flour corn, plus other types of corn like popcorn.

# O'odham Mottled Lima Beans

*Phaseolus lunatus*

This is one of several species of dried beans grown by desert people. Mottled limas are large beans that are less hardy than tepary beans but are still tolerant of salt, alkaline soils and drought. They produce beans several times in a season.

# Panic-grass

*Panicum sonorum*

This millet-like seed was thought to be extinct until recently. It is planted by broadcasting it in beds during the summer rainy season. People used to plant it in river floodplains after the waters receded. The seed is ground and used in breads and cereals.

# Poverty-weed

*Monolepis nuttalliana*

People gather these young plants soon after they emerge in response to the winter rains. The young plants, which grow in rosette form close to the ground, are boiled and eaten. The tiny seeds used to be collected for food.

# Striped Cushaw Squash

*Cucurbita argyrosperma*

This squash provides food all through its growing season. People eat its flowers and immature fruit as well as the mature fruit and seeds. People used to remove the rind and seeds and cut the squash into strips which were dried for use later.

# Tepary Beans

*Phaseolus acutifolius*

Of all beans, teparies are the most tolerant to drought, heat and alkaline soils. They are also resistant to bruchid beetles and bean blight. Tepary beans are still grown in large quantities all over the Southwest. They come in many colors including white, brown and tan.

# Wright Saltbush

*Atriplex wrightii*

People collect the tasty leaves and stems of this wild plant in spring when it is still young. It is traditionally cooked along with cholla buds. The leaves are sometimes stored after being thoroughly dried in the shade.

# *A Variety of Foods*

Corn, beans, squash — today, these well-known foods, originally grown by American Indians, are eaten world-wide. But the wild foods of the desert are less well-known, even by current residents of the desert.

In earlier times, even the most agricultural people relied on wild plant foods to provide nutrients and variety to their diets. Some, like mesquite beans, were staples; they were gathered in large quantities and stored for use throughout the year. Other plants, like careless-weed, were eaten in large quantities when in season. Still others were only occasionally acquired.

In late spring the desert harvest begins with the emergence of leafy greens, delicately flavored buds and flowers, and succulent stems. But desert foods are most abundant in the summer when many desert plants fruit and set seed. Juicy cactus fruit and nutritious seeds from grasses, trees and shrubs can be collected in large amounts. Summer is also the time for harvesting cultivated crops.

In the past, people stored much of their food for use in lean times, like winter. Many foods were stored after drying, a relatively easy task in the hot, dry desert environment. Some foods were cooked before drying. For example, corn and cholla cactus buds were roasted first and grass seeds were often toasted. Fruits were often made into jam or syrup for storing without refrigeration.

The desert provides a tremendous variety of tasty and nutritious foods. Through the ages, people have accumulated traditions about these foods, many of which persist today as part of this region's cultural heritage.

# Mesquite Bosque

Dense mesquite bosques provide islands of shelter in the desert. These bosques (Spanish for small forest) develop where mesquite roots reach groundwater, often along meandering water channels.

The interior of the mesquite bosque is often park-like due to dense shade and fires, both natural and man-made. Old, fire-scarred trees are common. Bushes, vines and grasses grow underneath the trees providing additional food and shelter for the abundant wildlife found in this habitat.

Mesquite bosques were more common a century ago before people dammed rivers and pumped groundwater. Bosques have also been cut to make room for agricultural fields and pastures and to supply mesquite charcoal.

## Gray-thorn

*Zizyphus obtusifolia* v. *canescens*

In spring, people would spread a blanket or mat under these shrubs to catch the ripe purple fruits that fell as the branches were shaken. These small fruits were often mashed, boiled in water and then strained to remove the hard seeds. The resulting juice was simmered down into a delicious, sweet, purple syrup.

## Knot Grass

*Paspalum distichum*

Knot grass is a native grass found in mesquite bosques. It grows rapidly in the summer and is dormant in the winter. Today, grasses introduced from Europe and Africa often compete with and replace native grasses.

## Mesquite (Honey, Velvet)

*Prosopis glandulosa, P. velutina*

Mesquite is sometimes called the desert's tree of life because it has so many uses. Mesquite bean pods were a food staple to many native peoples. Its hard wood is useful for construction and fuel. Among other uses, its sap, pitch and leaves have medicinal and cosmetic applications. Even its roots are useful; they provide fiber for cordage.

## Wolf-berry

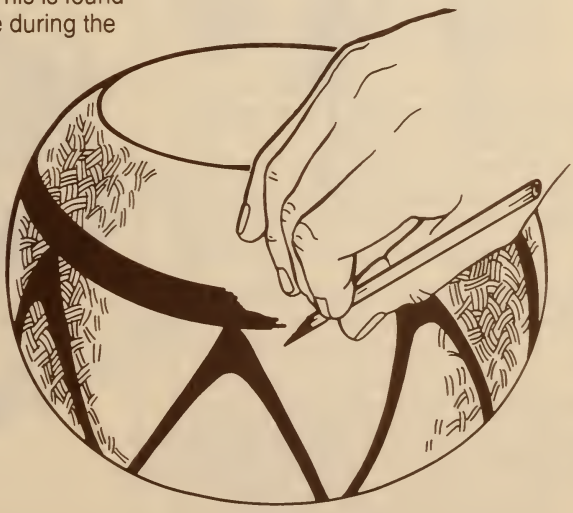
*Lycium* spp.

The fruits of this bush continue to be popular among native peoples all over the Southwest. People collect the orange-red fruits in the spring. They are eaten raw or dried but are more commonly mashed and boiled to make a pudding.

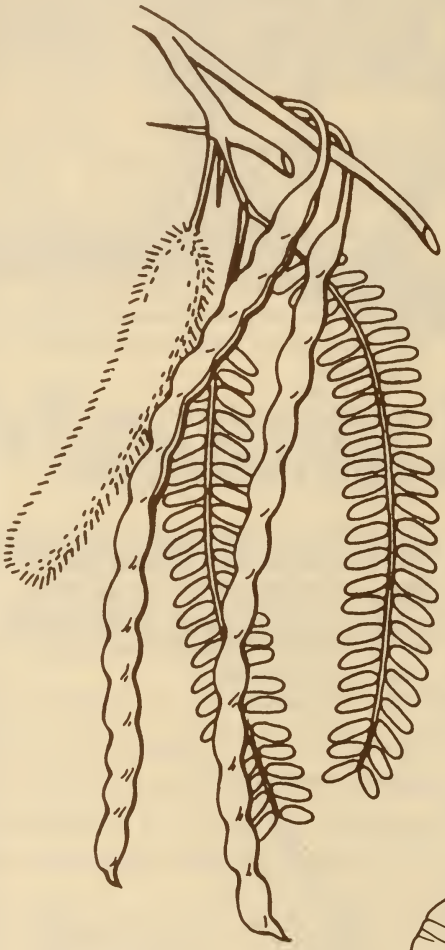
## *How to Make Mesquite-pitch Pottery Paint*

Find mesquite trees with shiny black pitch on the bark. Use a dull knife to pry off these pieces and boil them until the water is very black. Strain and continue simmering the black liquid down to a milky consistency. Add some globules of golden mesquite sap, if available, to give the paint body and shine. This is found on the branches of the tree during the warm seasons.

Paint designs on pottery that has already been fire-hardened. The designs will look brown. Heat the pottery over very hot coals or put it in an oven at 500 degrees for 15 minutes. The design will now be black and permanent.



# *Mesquite Beans: How to Make Mesquite Flour*



Mesquite pod flour adds flavor and sweetness to many foods. Try substituting it for up to ½ the flour in bread, cake and cookie recipes.

To make mesquite flour, collect the ripe bean pods in summer. Use a small rake or saguaro fruit collecting pole to pull down the branches so you can reach the beans. Ripe beans are tan or streaked with red, crisp and sweet to the taste. Be sure and taste the beans of each tree before collecting because some trees have sweeter, tastier beans than others. You can also pick up freshly fallen bean pods.

On a dry day, break the beans into your blender and grind for about 15 seconds.

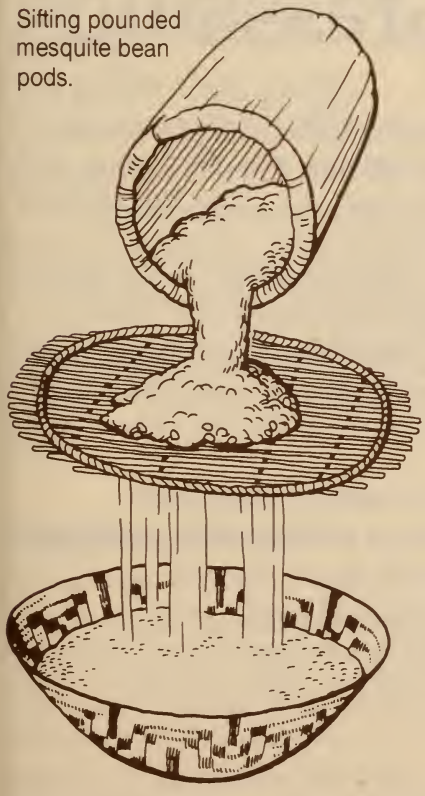
Pounding dry, ripe mesquite bean pods in a wooden mortar with a stone pestle.

Sift out the seeds and fibers and store the flour in an air-tight container. For a finer flour, sift again through a finer sieve.

Before the days of blenders and food processors, mesquite beans were crushed in mortars. Sometimes these mortars were made out of tree trunks. They were also made out of stone. The shaped pestles used for pounding were made from wood or stone as well.

If you wish to store the bean pods, keep them in the freezer or heat them at 150 degrees for 3 hours to kill the beetle larva inside the seeds.

Sifting pounded mesquite bean pods.



Sifted mesquite flour.

# *Medicines*

For centuries people have used hundreds of plants for medicinal purposes. They made teas or infusions from the leaves, stems or roots, and either drank the infusion or used it topically. They used some plants as poultices and bound them to the afflicted part of the body. They also dried plant parts and ground them into powders. Sometimes a plant was used because of its color, shape or smell and not necessarily because of its medicinal properties.

A great deal of skill and experience is needed to use plant medicines successfully. The concentration of chemicals in plants can vary depending on the age of the plant, the season, location and many other factors. Some plants with medicinal applications can also be poisonous.

Scientists continue to study and identify medicinal properties of plants, especially those with a long history of use. Sometimes historical accounts are confusing because plants may have been used in different ways by different people. To date scientists have identified the active ingredients of many plants that desert people used for medicinal purposes.

# Semidesert Grasslands

Semidesert grasslands border the Sonoran Desert mostly to the east at elevations between 3,500 and 4,500 feet. They are areas of transition between the desert below and the woodland above.

The grasses found in this habitat are "bunch grasses". They grow in clumps and do not form dense, continuous mats like the turf grasses common in home landscapes. Semidesert grasslands have more than just grasses. They also support shrubs, succulents and a few trees.

People from the desert often traveled to nearby semidesert grasslands to gather wild plants and hunt animals on a seasonal basis. When settlers brought cattle to the area a century ago, heavy grazing drastically reduced the natural grass cover.

# Catclaw Acacia

*Acacia greggii*

People have used the strong wood for construction and fuel. In late summer, the seeds are collected to grind for food.

# Desert Hackberry

*Celtis pallida*

The small orange fruits, including the crunchy seeds, are delicious fresh or dried. They are available in late summer or early fall.

# Desert-willow

*Chilopsis linearis*

Basketweavers sometimes use the branches in baskets. The wood is used for construction.

# Grasses

## (Big galleta, Bush muhly, Green sprangle-top, Sand drop-seed, Side-oats grama, Tangle-head, etc.)

People use the stems or roots of grasses to make brooms, brushes and baskets. They also use these plants as fuel and for thatching.

Many grasses have edible seeds. To collect them, gatherers either shake the seeds into baskets, cut off the seed heads, or burn patches of grass and rake up the parched seeds.

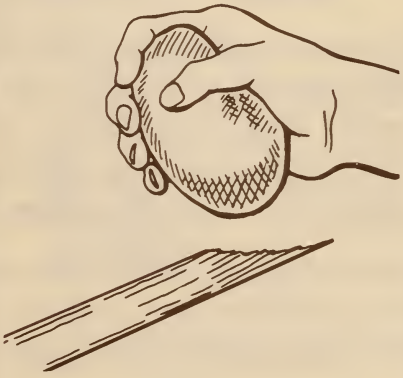
# Soaptree Yucca

*Yucca elata*

This useful plant is a source of food, fiber and soap. In early spring, people cook and eat the tender young flower stalks. In May, the delicate white flower petals can be collected and eaten, either fresh or cooked.

People make baskets from the leaves and cord from the leaf fibers. They pound the thick, fibrous roots in water to make soap-like suds for cleaning.

## *How to Make a Yucca Brush*



Yucca brushes made from either fresh or dried yucca leaves are used to paint pottery, masks and other objects. Brushes can be wide and thick for broad lines or narrow for thin lines.

To make a brush, cut a yucca leaf to the length desired, about 5 inches long. Split the leaf if you want a thinner brush. Gently pound the end until you have crushed the thin coating that covers the fibers. Separate the fibers and scrape the pulp away to make a small brush.

# Chaparral

Chaparral habitats are noted for their dense growth of shrubs and small trees. They occur mainly along the northern margins of the Sonoran Desert at elevations of 3,500 to 6,000 feet, and receive 13 to 23 inches of rain each year. In the lower elevations, desert vegetation mixes with chaparral plants.

Chaparral shrubs often have small, leathery, evergreen leaves. Their deep roots help prevent erosion and most species regenerate quickly after burning.

Desert people often traveled to chaparral habitats to take advantage of the rich diversity of plants there. Many of these plants were important sources of food, fiber, timber, medicine and dye. In the last century, cowboys traveling through chaparral country wore leggings to protect themselves from the tough vegetation. These leggings were called "chaps" after the country itself.

# Agaves

*Agave chrysantha, A. murpheyi A. parryi,*

Agaves, or century plants, are among the most useful plants of the Americas. The thick stems and flower stalks of some species are edible and their leaves contain long fibers useful for weaving and making cord (see p. 28-29). Medicines and soap have also been made from this plant. Today, it is best known for its use in tequila and mescal.

# Banana Yucca

*Yucca baccata*

For centuries people have enjoyed this plant's sweet, banana-shaped fruit. People eat the fresh fruit or bake it, remove the peel and seeds, and dry the pulp in the sun for use later. They also pound the thick fibrous root in water to make suds for cleaning. The thick leaves can be plaited into mats or sandals and their fibers used for weaving and cordage.

# Buffalo Gourd

*Cucurbita foetidissima*

People have used the tuberous root of this plant as a soap and topical medicine for infections. The rind can be used to make containers or rattles, but is not as durable as the cultivated gourd.

# Cliff-Rose

*Purshia mexicana*

People used strips of the fine, soft inner bark for cradle padding, clothing, rope and mats.

# Manzanita

*Arctostaphylos* spp.

The red fruits of this shrub are eaten fresh or can be made into a tasty jelly or juice. Manzanita is Spanish for "little apple".

# Mountain-mahogany

*Cercocarpus betuloides*

A rich, red-brown dye is made by boiling the root bark. It gives the strongest color when dug in the fall. Various shades of red or tan are achieved by adding other ingredients to the dye bath such as prickly-pear fruit or juniper ashes.

# One-seed Juniper

*Juniperus monosperma*

People eat the purplish fruits either raw or cooked. The berries can be heated in a pan, mashed and mixed with a little water, then simmered into a thick, white gravy.

The wood is used for construction and fuel, and the twigs and bark make yellow and brown dyes. Tea made from the leaves has been used to treat respiratory illnesses.

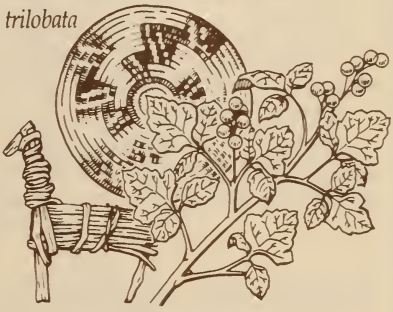
# Red Barberry

*Berberis haematocarpa*

The orange-red fruits are eaten fresh or cooked and make a delicious jelly. A bright yellow dye is made by boiling the roots.

# Skunkbush Sumac

*Rhus trilobata*



People have used the long, pliable branches of this shrub to make baskets. They also eat the tart, red berries and make a drink like lemonade from them. In earlier times, this drink was sweetened with dried agave heart.

# Sotol

*Dasylirion wheeleri*

The hearts of sotol, while edible, are said to be woodier than agave hearts. People used to prepare them in the same way as agave.

Sotol's long leaves are excellent for plaiting baskets and mats, once the toothed margins of the leaves are removed. Its woody flower stalk is useful for construction.

# *Roasting Agave Hearts*

Several agaves have edible hearts (the short, thick stem after the leaves are removed). Agave hearts are sweetest when collected at the time the plant's once-in-a-lifetime flower stalk is about to emerge. At this time the plant is high in sugar which it uses in flowering. In the past, agave hearts were baked in roasting pits and then dried for use later.

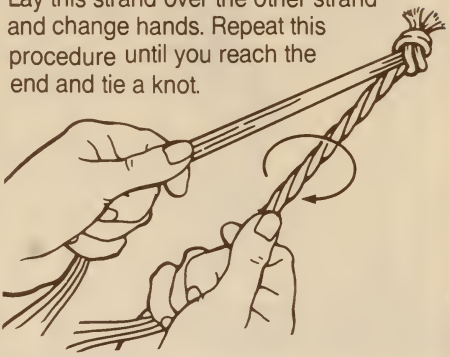
Agave heart

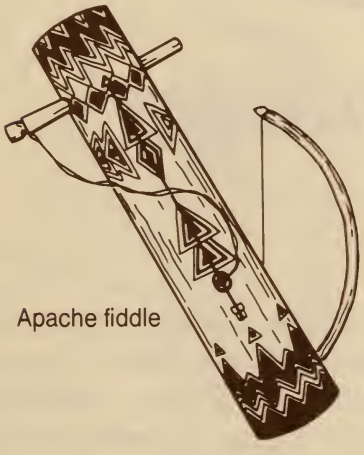
Agaves roasting in a rock-lined pit.

# How to Make Agave Cord

It is best to work with dried agave leaves or leaves that have been cooked, because raw agave sap can be irritating to the skin. To obtain the fibers from agave leaves, use a rock to gently pulverize the outer coating of a dried leaf and free the fibers. Or, you can wrap the leaves in aluminum foil and bake them for 2 hours at 350 degrees. Then, scrape off the leaf coating and rinse in water.

To make cordage, separate the agave fibers into two strands. Tie a knot in the end and tack it to a wall. Hold one strand in each hand. Twist the strand in your right hand clockwise or away from you. Lay this strand over the other strand and change hands. Repeat this procedure until you reach the end and tie a knot.





Apache fiddle

# Music of the Desert

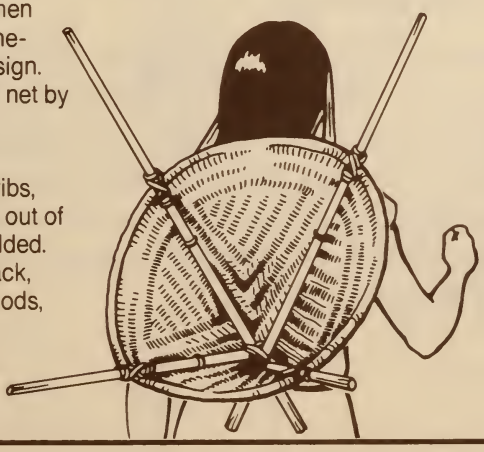
Desert people sing, dance and chant to music made with the help of desert plants. They keep rhythm with drums and gourd rattles. They add the scraping sound of rasps, the soulful whistle of reed flutes and the whir of bullroarers.

The Apache make a unique fiddle-type instrument out of dried agave flower stalks. First they remove the fibrous pulp from the thin woody shell of the stalk. Then they seal the ends, carve in the sounding holes, decorate and string the fiddle. They play it with a bow much like a violin bow.

# How Agave Fiber Carrying Baskets Are Made

O'odham (Pima and Papago) women used agave twine to weave a cone-shaped net with an interesting design. They brightened the design of the net by rubbing in colors of red, yellow, black and blue.

The net was tied to four saguaro ribs, and a headband and apron made out of the plaited leaves of sotol were added. This basket was carried on the back, and was used to haul firewood, foods, pottery and other burdens.



# Future Resources Garden

This trail has shown how plants from the Sonoran Desert region have been used in the past and continue to be used in the present. Modern uses are being found for some of the desert plants that native people have used for centuries. Today, desert plants are being used as new sources of food, medicine, cosmetics and industrial products.

Research being done today may provide information about desert plants that will be used in the future. The traditional uses will not be abandoned, even though new uses may be found. As new uses are discovered, more desert plants may be grown commercially. Because they are so well-adapted to this hot, dry climate, they can be grown more successfully and with less water than many other crops.

# Candelilla

*Euphorbia antisyphilitica*

Wax extracted from the stems is used for polish foundations and in chewing gums. Candelilla is from the Chihuahuan Desert.

# Chiltepines

*Capsicum annuum* v. *glabriusculum*

This native Sonoran Desert plant produces little red berries which are fiery hot. Tons are harvested from Mexican mountainsides and sold in the United States as a dried spice and condiment ingredient. Recently, chiltepines have come into field cultivation.

# Guayule

*Parthenium argentatum*

A good quality rubber can be made from substances contained in the leaves and stems of this Chihuahuan Desert plant. The prehistoric Hohokam Indians used game balls made from guayule, and over 500 years later during World War II it was used as an emergency source of rubber. The Gila River Pima Indians have reinitiated commercial cultivation of this plant.

# Jojoba

*Simmondsia chinensis*

This Sonoran Desert plant is under study as a source of industrial oil. The liquid wax extracted from the seeds has properties similar to sperm whale oil. It is currently used in cosmetics.

# Lechuguilla

*Agave lechuguilla*

There is an international market for brooms and brushes made from the leaf fibers of this Chihuahuan Desert plant. The leaves from both wild and cultivated lechuguillas are collected.

# Prickly-pear

*Opuntia streptacantha, O. megacantha*

These prickly-pears yield abundant harvests of large, delicious fruit that are marketed in the United States and Mexico.

# Resin-weed

*Grindelia camporum*

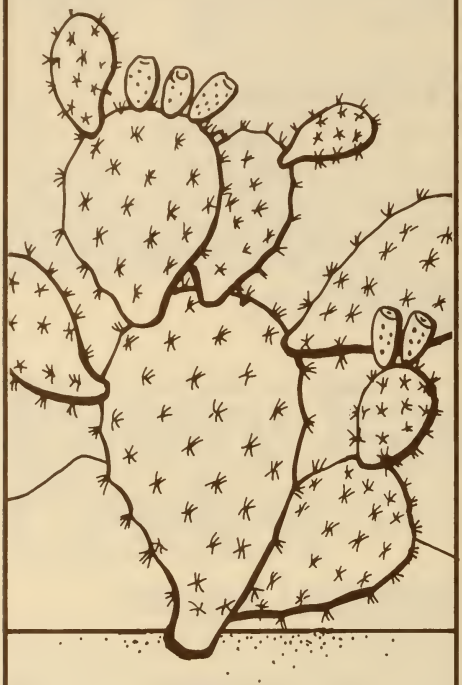
Resin extracted from this plant may serve as a substitute for pine resin. Resin comes from the leaves and stems which are collected in late summer; the plant is dormant in the winter. Resin-weed is from the Mohave Desert and other dry areas of California.

# Sonoran Oregano

*Lippia palmeri*

This Sonoran Desert plant and its Chihuahuan Desert relative are the major sources of oregano-like spices in the United States. They have replaced European oreganos in recent times.

# *Cooking with Prickly-Pear Cactus*



Prickly-pear cactus provides food in two seasons, spring and summer.

In spring, use tongs to collect the tender, young stems. These young stems or pads have small leaf-like structures and little or no spines. Scrape off the leaves and spines, and trim ¼ inch off the edges. Dice and boil until tender, about 10 minutes. Rinse well in cool water. Add to salads, soups, stews or scrambled eggs.

In summer, use tongs to collect the juicy, ripe fruits. An easy way to get the juice for jelly or punch is to place the unpeeled, cleaned fruits in a kettle with about ½ inch of water. Simmer until soft, then press out the juice with a potato masher. Strain the juice through cheesecloth to remove all spines.

# *Gentry Agroecology Project*

The Gentry Agroecology project is the Desert Botanical Garden's experimental farm located adjacent to McDowell Road. This farm is a scientific research project dedicated to developing economical and ecological methods of agriculture for small scale farms in the arid Southwest and adjacent Mexico. The term "Agroecology" is based on the project's use of evaluation techniques from both the agricultural and ecological sciences.

Specific research topics include inter-cropping (or companion planting), ways to encourage beneficial wildlife, and perennial food and agroforestry plants.

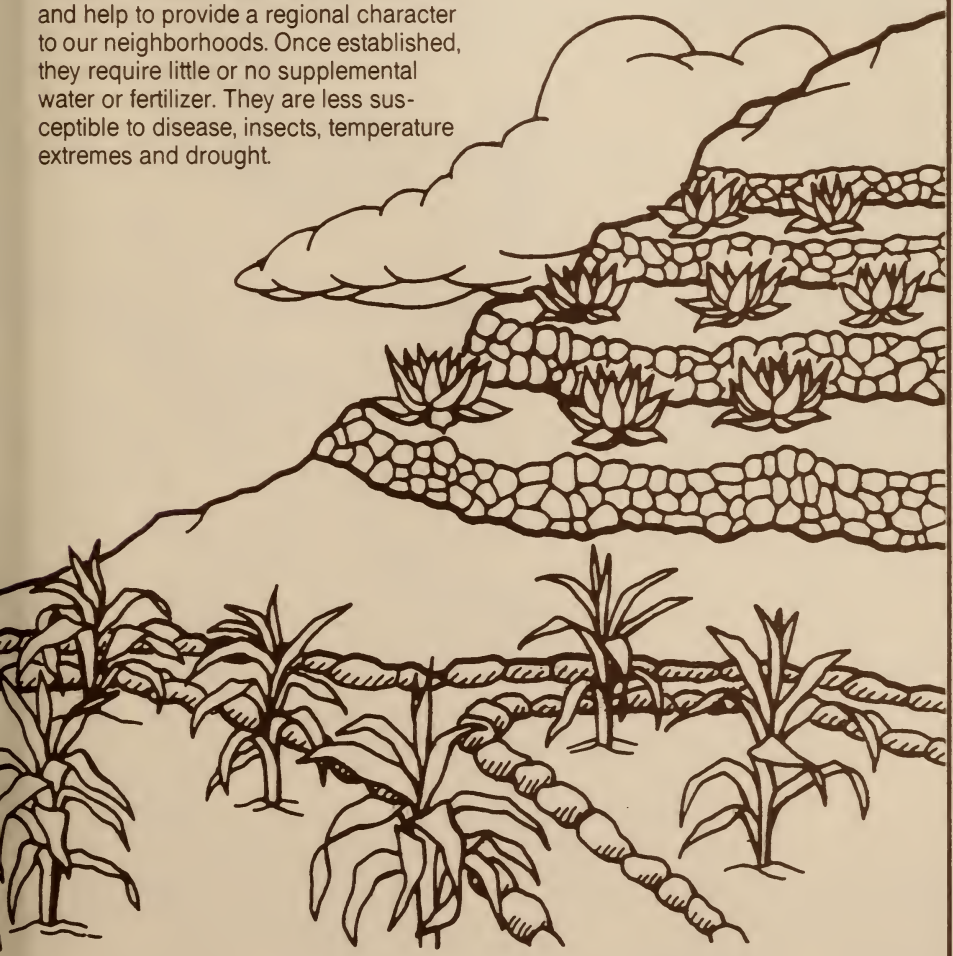
The drought-hardy natives currently under study are wild chiles, oreganos, agaves, prickly-pear cacti, desert legume trees, panic-grass, tepary beans and wildflowers.

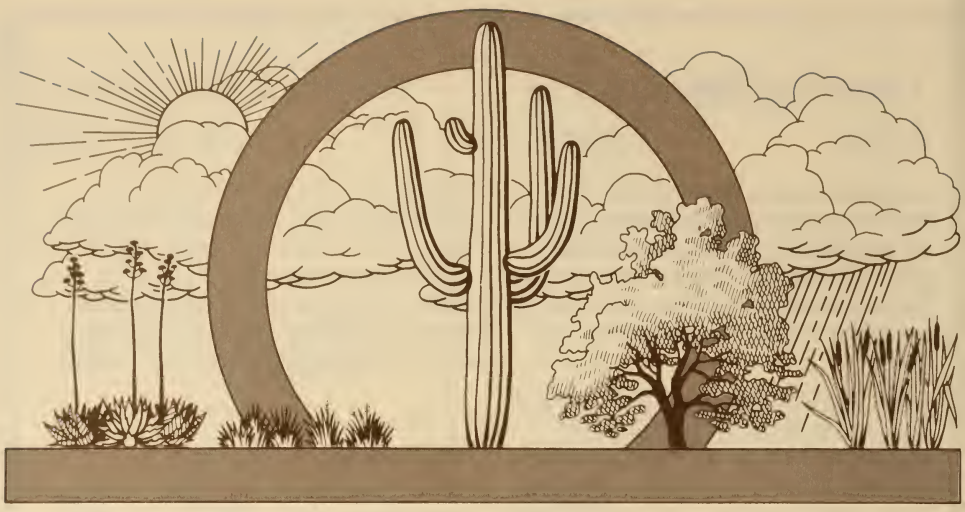
# *Growing Your Own*

In addition to serving as economic resources, regional plants are exceptional for landscaping. As new knowledge is gained about the propagation and growth habits of these plants, more and more are appearing in local nurseries and plant sales.

Using native plants has many advantages. They are aesthetically pleasing and compatible with the natural environment and help to provide a regional character to our neighborhoods. Once established, they require little or no supplemental water or fertilizer. They are less susceptible to disease, insects, temperature extremes and drought.

Furthermore, the use of these plants helps replace the plants lost to development, and the food and shelter they provide attracts desert wildlife. Home-grown plants can be harvested for human use as well. Many provide food, fiber, dye and construction material.





# *Protecting the Natural Environment*

We have learned that human beings have used the natural richness of the Sonoran Desert region for centuries. Today, however, we have the power to permanently mar or even destroy this beautiful but fragile land if we do not use it wisely.

Rather than just seeing the environment as an economic resource, we must learn to respect these desert lands and preserve and protect them.

In many states and countries there are statutes that make it illegal to gather certain plants or plant parts. These laws are necessary to protect plant populations and the natural environment. In Arizona, many plants are protected under the Native Plant Law.

If you are interested collecting or using native plants, we recommend that you grow them in your home gardens. Otherwise, you must get permission from the appropriate land owner before you collect. This applies to private as well as public lands.

For more information about the Native Plant Law contact the Arizona Department of Agriculture and Horticulture.

# *Suggested Reading List*

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Desert Botanical Garden

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